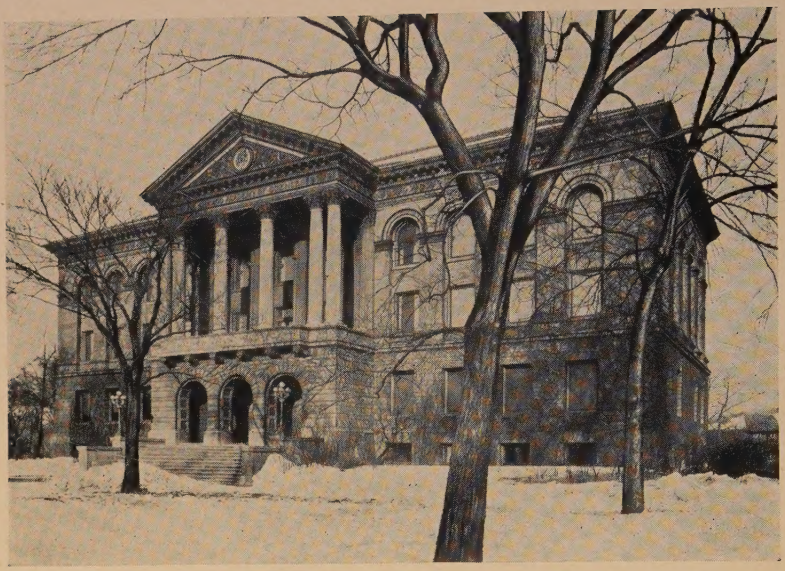
The CHICAGO NATURALIST

Published by

THE CHICAGO ACADEMY OF SCIENCES

VOL. 1 · NO. 1 · APRIL · 1938



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The Chicago Naturalist

Published four times a year by
THE CHICAGO ACADEMY OF SCIENCES
for Naturalists of the Chicago Area
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VOLUME 1 · APRIL, 1938 · NUMBER 1

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A Note of Introduction

Publication of *The Chicago Naturalist* is an endeavor to bring the Chicago Academy of Sciences into closer contact with its members and friends in the hope that its activities may be broadened and its usefulness increased. The Academy exists not for its own gain but for the services it may render to the community in which it functions. Although of a popular nature, this publication is in keeping with the ideals of that far-seeing, small group of men who in 1857 laid the plans for an organization "for the promotion and diffusion of scientific knowledge." A more meaningful appreciation of scientific work must be developed in those not actively engaged in it. In addition, we hope that this publication may stimulate and sustain interest in natural history as a pleasurable and worth-while avocation for those who enjoy time spent out of doors.

The Chicago Naturalist will be open to articles on any of the phases of natural science—from the heavens to the depths of the earth. Evident interest in things close at hand will, of course, encourage emphasis of the natural history of the Middle West and the Chicago Region in particular. In addition to informative and interesting non-technical articles it will contain brief notes from field and laboratory, reviews of books and other current literature, a calendar of events of interest to naturalists of the Chicago Area, notes from the Trailside Museum in Thatcher Woods, and accounts of the Academy's activities, plans and progress. For the present it will be published four times a year. Members and friends of the Academy are invited to contribute articles that may be suitable. Short notes on field experiences or observations of general interest are especially desired. The editors will welcome suggestions and constructive criticisms.

The Chicago Naturalist is not conceived as a commercial project. It is offered adjunctly with membership in the Academy. A new classification of membership has been created so that, together with other privileges of membership, it is within reach of all. The editors will do their utmost to make *The Chicago Naturalist* interesting and useful. We hope that you will enjoy it.

Nathan S. Davis, III, President,
Howard K. Gloyd, Director.

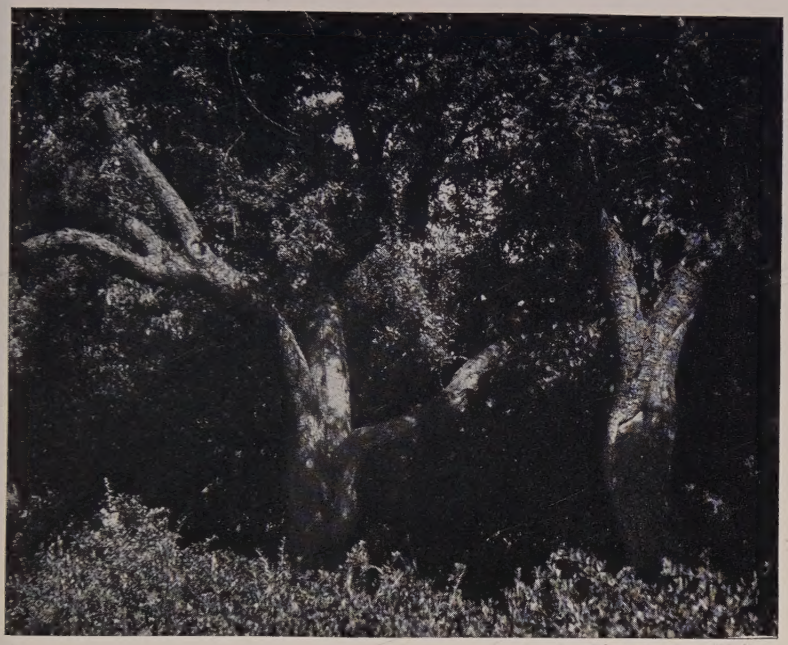


Photo by Don Wallace

Spring Song at the Grove

Donald Culross Peattie

THERE may be places in the world where bird song, of a spring morning, rings out louder, from more varied voices, than the wild matins at Kennicott's Grove, but I do not know of it. Not in Florida, California, the Michigan northwoods, or Provence, have I ever heard, in one spot, at one time, so many sorts of voices uplifted.

Actually the list of birds (carefully compiled before me as I write) is not especially impressive. It is a little shorter than in the days of Robert Kennicott, who grew up here, a century ago, and under these same oaks taught himself the book of Nature. But it is to the many habitats that one must ascribe the variety of this choral. Were this square mile all forest, or all meadow, all watery, or all suburban, the music would be thinner, more monotonous. But there are chains of hidden sloughs in the woods, where bitterns cry at the intruder, and rain-filled hollows in the open grass where killdeer wheedle and complain. You slog through swamp woods of ash and linden, where the sultry song of the cuckoos and the wailing of the tree-frogs follow you,

only to emerge in a sunny thicket of flat-topped hawthorns, where the yellowthroats and goldfinches pour out their music. Redwings jingle and scold from the cattails; short-billed marsh wrens lisp out their little songs in the sedge marsh. From earliest spring when the meadowlarks whistle across half melted snow, to the skirling lay of black-throated blue warblers under June's dense canopy of leaves, The Grove is a choirstall of spring hymns.

It is hard to remember that most wild song is not really conscious poetic praise of the lengthening day, the greening trees, or the tender airs—not, in short, an expression of happiness. And that it is not even, or at least not wholly, an entreaty to some coy mate. In great part bird song (as distinguished from alarm cries and other signals) is a proclamation by the males of territory. It warns other males, especially of the same species, that all within earshot is the singer's bailiwick. It promises to the arriving females that here they will find a protector. But the end result, of course, is very much the same as if the males should sing to their mates, and to the human ear all this outpouring of melody is inseparable from the emotions of happiness, of reverence for beauty. One may be pardoned therefore, I hope, for some poetic license in the notes that follow. These frankly informal passages have been gleaned from the diaries of several years lived at Kennicott's Grove, in northern Illinois, years during which the writer was not absent for a single morning.

March 1. Cardinals calling lustily, "What-cheer!" The weather balmy with pale watery sunshine and the snow melting rapidly. Tree sparrows rejoicing.

March 5. A warm, wild March day—sun and flying cloud and a western gale. A single killdeer alighted with plaintive cries upon the temporary ponds of the prairie. Made off at my approach, winging sideways and crying as if wounded.

March 12. Heard today the exquisite singing of a flock of tree sparrows; they have now left off their icy, tinkling winter song and gone into the bridal aria. Though the wind was keen and the snow in flurries went spinning through the steely bare oaks, the whole flock sang intensely, as joyfully as if spring had come forever.

March 13. The first meadowlark today

sang from the fields. This one was an especially varied and beautiful singer, his voice coming across the snow and the solemn naked prairie plain with something priestly and unearthly in it.

March 15. Was awakened this morning by a robin singing "Wheeyou? Wheeyou! Chee-you, chee-up!", interspersed with the flickering "whit-a-bit-a-bit-a-bit."

March 16. Rainy, warm, blowy, and a grackle flock alighting in the willows. Wheedling, spitting, croaking, and for an instant sweetly whistling, their voices break again harsh and mocking.

March 18. Arising this morning at about three o'clock, I heard the first notes of *Pseudacris,* the swamp tree frogs. In the darkness the effect is shivery, sad, high, thin yet pleasing. At eight o'clock the first bluebird winged down, alighting as if the earth could scarcely hold it, to whistle a few robin-like notes, but in a rich contralto.

March 19. Frogs singing at night but not by day.

March 21. At eight this morning *Pseudacris* frogs were calling lustily from the pond, and to their music was joined the watery ecstatic trill of unseen redwings, as well as the canticles of robins.

March 22. The first morning doves cried out on the chill airs, but they make one think of shady afternoons in June.

The piping of *Pseudacris* frogs sounds as if the individual frog sang *pip, pip, pip,* in a rising key. But as there are hundreds of voices the whole effect is like the rising of bubbles, a continuous sweet, creaky-cracky effervescence.

Over this haphazard joy soared this morning at about nine o'clock the high, melancholic vibrato wail of a solitary *Hyla* or tree frog.

March 23. The *Pseudacris* frogs show themselves now, and are so preoccupied with singing as to be unwary. They swim weakly about in shallow water with marvelously distended throats.

A single frog voice of a wholly different sort was heard in one of the wood ponds. It sounded like someone choking just under the surface. Probably a leopard frog.

Juncos are coming through from the south in a horde (though a few are here all winter). The males, in costumes slightly brighter, continually lisp and twitter what I suppose must be called their song.

March 25. Walter Necker and I heard a single wood frog in a forest pool.

March 27. Still hoarse and uncertain of melody, the first song sparrows were on the

air today.

March 28. Again the wood frog was heard. He calls with a chuckling sound or rather, as it strikes me, an insect-like rasp, as when the file of a comb is swept with the nail.

March 31. Woods full of robins. Downy woodpeckers conspicuous, both sexes constantly on the move and the males flexing voices fluently in a weak "wick-up" song. Chicadees have begun to sing more frequently than in winter. Meadowlarks whistling for mates as I have never heard them before, and all this though the day was bleak and sad.

March 31. Stopped in the woods to listen to the golden-crowned kinglet's lovely and unappreciated little song. It rises swiftly in a sweet twitter.

April 4. Snow began to fall five days ago, and is now about nine inches deep. Ice coats the lake again. Wood ponds deeply frozen. Winter conditions restored, and the nuthatch again scraping his winter note. Juncos plentiful, increasing the impression that this is January. Driven in by cold, brown creepers, nuthatches, and golden-crowned kinglets continue numerous about the house.

April 6. The singing of the frogs ceases in the snow and is desultory in blustering weather. But when you walk around the icy pond you hear a faint peeping of the *Pseudacris* frogs as though they were very far away. Discovered that they sing under ice!

April 11. Robins passing through now in a storm, "wickupping" and scolding. A hundred estimated on the lawn at twilight.

April 11. Now the thawed ponds ring with redwing calls—angry metallic *peents* when you pass, rejoicing when you leave. Grackles spatter in great clouds through the trees now.

April 14. Myrtle warblers blowing through in a crowd, and many yellow-throated vireos. The song of these last is almost miraculously varied, swift, and tender, but so pianissimo that you have to steal close to hear the bird sing at all.

April 17. At dawn I heard the first thrush. Just a moment of song, the announcement of a heavenly theme.

April 18. Bold and confident of charming, the brown thrasher has begun to sing. The chewink's call-note heard, and, once, his early-morning song—the twirl of notes followed by the jingling tumble.

April 20. Warm and cloudless day, and the *Pseudacris* frogs singing lustily again after cold. Myrtle warblers bounding on the limb.

April 22. The whitethroat utters a few plaintive uncertain notes quite unlike his full melody of piercing sweetness.

April 25. Auspicious beginning to the day: the brown thrasher led off the morning chorus, and (surprisingly early) the yellow-billed cuckoo stuttered forth some notes. In the wood ponds I surprised a green heron and heard its "skeow" of alarm.

April 26. Song sparrows, their migration wave gone past its peak, perhaps, are yielding the air to the more summery field sparrows, and vesper sparrows rival them. Heard the soft eery trill of *Hyla versicolor* rising above the chorus of the *Pseudacris* frogs.

April 26. Though the weather cool and the morning cloudy, the bird chorus was glorious. Jays tootling their "summer happiness" call, woodpeckers coming in heavily on the drum, chewinks and phoebes, flickers and whitethroats, robins and thrashers all *a capella.* Still from the fields wells the joy of the meadowlarks. Male pheasants crow in their scratchy, herony voices, and show themselves boldly now, their hens scuttling and scratching demurely about their lord.

April 29. The snoring croak of the leopard frog was heard again.

April 30. This very warm day the frogs were louder than at any time since the first days of March. Last night and again tonight I heard the sweet wailing of the hylas and the deep rattle of the leopard frog. Besides his "snores" he usually gives a few chuckles like the croak of some water bird. Leopard frogs can be heard now in every big pond. Over the housetops in the green long twilight wheel the barn swallows, peeping and wheedling that they are glad to be back.

May 2. Croaking, hoarsely screeching, a Florida gallinule wheels up from the pond and, the color of a rainy sky, storms into the trees, to sit there morose and imagining himself, apparently, invisible though he is big and conspicuous.

May 6. Walked on the prairie where only sweet vernal grass was as yet in flower. Ventriloquistic, the cries of meadowlarks rang about me, and bobolinks, gathered into little companies of five and ten males together, sang in rivalry or scolded at me.

May 6. At dawn, the first whip-poor-will of the year, just two "whips," mysterious and southern-sounding. The bird, connoting Appalachian summer nights, seems to have nothing to do with The Grove.

May 6. Lustily, indefatigably now, chatter the housewrens. Very hot, and *Hylas* and *Pseudacris* trilling again. For the first time the night fields send us cricket voices—like autumn.

May 9. The morning chorus is enchanting. Yellow warblers add their golden voices to the chorus, and chestnut-sided warblers are passing through.

May 10. The whip-poor-will again, just a few

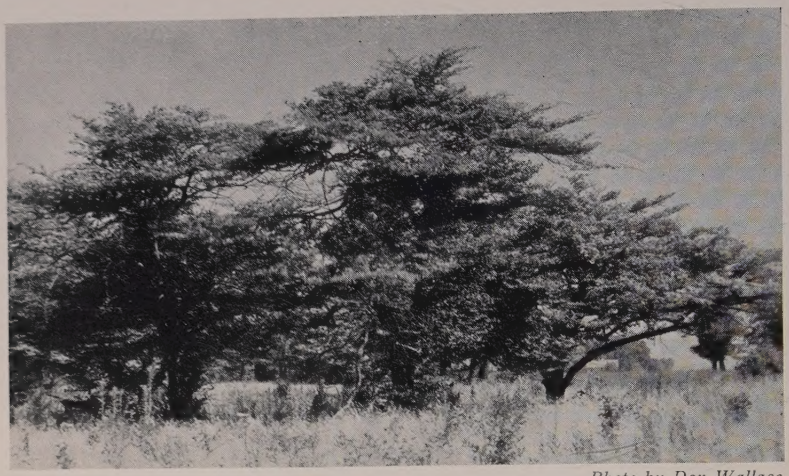


Photo by Don Wallace

A sunny thicket of flat-topped hawthorns, where yellow-throats and goldfinches pour out their music.

notes, and the thrush too sings only a little. At dusk or when rain threatens hylas chant. The leaves are fast rushing out, and in the midgy shade the black-billed cuckoo skirls his sultry call, quite different from the stuttering cry.

May 11. By day the air is filled with the honeyed songs of yellow warblers singing full tilt. Suddenly there are several pairs of scarlet tanagers. The ear inclines attentively, during their always short stay, to try to memorize that lilting song—a little robin-like but rarer, sweeter.

May 12. Now the tree frogs' song gives way to the first trilling of the toads. The music of goldfinches around the aspens was so loud and blithe it sounded like the inside of a canary store.

May 15. Rosebreasted grosbeaks—at last! They are always an event for the eye, but it is training to the ear to distinguish the song from the best of the robin's music. Magnolia warblers aplenty. On the prairie the grasshopper sparrows are suddenly seen. You try to follow them where they drop among the grasses with a sharp insect chirrup, but when you wade right into the grasses where they disappeared they are gone. If you will swing around quickly you can see them flying away behind you.

May 19. Enchanting now are the songs of the northern yellow-throats, out where prairie and sedge pond and hawthorn thicket meet.

May 21. In the twilight, the voice of the whip-poor-will again, coming mysteriously through the sultry warmth heavy with the odor of wild grape.

May 23. Early up, and found the oaks jumpy with warblers,—beautiful Blackburnians and bay-breasteds. Bobolinks hover over the spear grass, tumbling out songs like words above the lush prairie.

May 24. Absurdly call the crack-voiced starlings. I suppose it is spring again, love again, even for starlings! The first pewee tuned up, and black-throated green warblers are here. Midges dance over the sloughs that at last take on the dark tannic look and the decadent smell of swamps. In them wriggled *Pseudacris* tadpoles. The songs of their parents are heard no more. Dominating the spring airs for weeks, they are more than silent. The choristers themselves seem to have vanished.

May 27. Silent flycatchers beyond telling are fluttering at the windows, and from the sunny oak woods rings out the squawks of the great-crested species. Three herons trailed majestically over the woods at six in the evening.

May 29. Nuthatches cry out now in their thin strangled voices in what I suppose is intended for the bridal song. Myrtle and magnolia warblers gone, and instead we have blackpolls. Vesper sparrows now call at night—as if they wakened sometimes to trill the stroke of the hour, and sleep again.

June 1. Dense foliage darkens the rooms, and flycatchers are at the panes. Willow slough is a green sargasso of algae strewn with pollen and water bloom, a jade fen smelling stagnant. Heydey of midges; mosquitoes unbearable in bosky places. Day long sings the thrush in the green gloom where a male orchard oriole flashes, tropical but gone without a song. Crickets chant all day, and small slim grasshoppers leap and buzz before you. The toads are still trilling and the cricket frogs have taken the place of the *Pseudacris*. In the garden at dusk—the swirl of a nighthawk round my shoulder, and, later, many of them mysteriously winging out of the woods across the fields, bird after bird, repetitive, ominous. Then the hour of the bat. Only the vesper sparrow's song, keeping faith, sleepily in the night. Fireflies joggling, winking, in the warm darkness, trotting lantern errands.

DONALD CULROSS PEATTIE, well known in Chicago for his featured column "A Breath of Outdoors" in the *Daily News,* was born very near to the Academy on June 21, 1898. He attended public schools in the city and also the University of Chicago where he studied botany under Professors Coulter and Cowles. Later at Harvard he studied zoology under Barnes and Wheeler and botany under Fernald. He married Louise Redfield, a grandniece of Robert Kennicott, the first Director of the Academy. His experiences with nature at Kennicott's Grove have furnished inspiration for some of his most interesting articles and his delightfully described intimacies with creatures of the wild have pleased thousands of readers. Among his scientific writings are *Flora of the Indiana Dunes* and *Flora of a Portion of the Blue Ridge of North Carolina.* His most recent books are *An Almanac for Moderns, A Prairie Grove, Singing in the Wilderness: A Salute to John James Audubon,* and *Green Laurels.*

JOHN R. BALL, associate professor of geology and paleontology, Northwestern University, was born in Fremont, Ohio, in 1881. He attended public schools in Seattle and Tacoma, Washington, then came to Northwestern as a student. Later he attended the Garrett Biblical Institute and the University of Chicago, receiving the degree of Doctor of Philosophy from the latter institution. His specialty in geology is invertebrate paleontology and his studies have centered chiefly in the fossils of the Silurian and other early Paleozoic formations of the Mississippi Valley. Since 1915 he has been interested in the Wisconsin shore line of Lake Michigan. His scientific writings include papers dealing with Silurian fossils, stratigraphy and shore line erosion. Since 1930 he has been associated with the Chicago Academy of Sciences as honorary curator of paleontology and since 1937 a member of the Board of Scientific Governors.

Wave Erosion Along the West Shore of Lake Michigan

John R. Ball

WHEN LaSalle and his fourteen men in four canoes journeyed southward along the west shore of Lake Michigan in 1679, the beginning and end of each day witnessed difficulties for the travelers. They had to carry the canoes to the top of the bluffs each night to protect them from the piracy of the waves. At embarkation, next morning, men up to their waists in the water had to steady the canoes for loading.

Today, however, the auto highway well inland from the shore makes it possible for the motorist to traverse the distance of LaSalle's journey in a day. And now, the canoe on the Lake waters is chiefly for those who wish to be slightly farther out from the shore than the bathers along the beach. But even where the Lake now offers its pleasures instead of its hardships, or where the highway now is near the top of the bluff, there is evidence that the waves which made travel hazardous for LaSalle have not ceased their attack upon the land. That evidence, whether viewed from the canoe out on the Lake, or by the bather on the beach, is a long horizontal ribbon of bare cliff, a tawny strip of denuded earthy material, which to the experienced observer is a token of waste and destruction.

A still more distant view from the deck of a Lake steamer or from an airplane impresses the same fact. The shores of Lake Michigan, nearly everywhere, are vertical cliffs carved in glacial clay, in dune sand and sometimes even in the ancient bedrock, the Lake's heritage from the Paleozoic seas. It is apparent then that Lake Michigan, in addition to having its own geologic history, continues actively today as a geological agent.

The effects of the Lake waves in erosion and deposition had their natural attraction for early students of geology in Wisconsin and Illinois. Their observations began nearly 100 years ago. I. A. Lapham, of Milwaukee, was one of the first definitely to recognize the deposits of lake waves in the vicinity of the present Great Lakes and to distinguish them from glacial deposits. Drs. T. C. Chamberlin, Edmund Andrews, and Frank Leverett, either members and officials of the Chicago Academy of Sciences, or contributors to its publications, recognized certain aspects of the geologic history of the Lake basin and commented on the geological work of its waters. To these and to numerous other writers the author makes acknowledgment of source material dealing with the geological history of Lake Chicago and Lake

Michigan. He amplifies also some of his own studies in the quantitative aspects of wave erosion and considers data from localities not included, it is believed, in earlier mention of shore wastage. Both for scientific and practical purposes, it is highly desirable that testimony of loss of land to the waves be secured from many witnesses. Probably many land owners, especially engineers and contractors, business men and teachers, possess statistical information in this connection. It is sincerely hoped that this paper will incite some correspondence with the Academy concerning recent operations of the Lake in destructive or constructive work.

Lake Michigan owes the existence of its basin to the tongue of ice which moved slightly in advance of the general spread of glacial ice during the Pleistocene epoch of earth history. The reason for this differential movement of the ice was due probably to the lowlands which were developed on the soft and yielding shales and limestones which lay in a strip now defined practically by the length and width of the Lake. The ice deepened this lowland undoubtedly, because the Lake bottom towards the north is below sea level. The glacier advanced along this stretch to points south and southwest of the site of Chicago. Where it paused, the melting of the ice along its margin produced a belt of glacial debris, which is known as a terminal moraine. The system of moraines built the closest to the margins of the present Lake, and just outside the area of the Indiana Dunes, constituted the earliest shore for the waters which accumulated between ice and high lands when the glacier began its eventual melting.

To reach beyond the present margins of the Lake the melt waters had to stand at higher levels than the present surface of Lake Michigan. Thus were formed several well-developed lines of shoreline features, at elevations ranging roughly from twenty to sixty feet above the present level of Lake Michigan. These ancient shorelines, although interrupted, stretch for impressive distances roughly parallel with the present shore and at variable distances from it. The lake forming them has received the name of "Lake Chicago" from the fact that these features are typically developed near the city. A unique feature of this glacial lake was that its northern shore was the front of the glacier. One would expect that the ice shore of Lake Chicago would shift so constantly in melting that the waves would not be permitted to work for appreciable time at one level. Possibly there are unrecorded chapters of imperceptible change in the history of Lake Chicago, but the ancient shoreline includes bluffs of sufficient height to indicate a long period of undercutting. In addition, ridges of sand and gravel—sand spits and sand bars—were built southerly in the waters of Lake Chicago for distances great enough to suggest that they were a long time in forming. Chicago and Ridge Avenues in Evanston follow the crests

of sand bars of Lake Chicago, while Ridge Road, west of the City, follows a sand spit of the highest, the 60-foot stage, of Lake Chicago.

While it thus seems that at times, practically for hundreds of years, the edge of the ice was stationary, it is equally plain that it was not perpetually so. The record of the shorelines at various levels together with other evidences for the existence of the Lake points to a history of extreme complexity. With the ice blocking the escape of the ponded waters to the north, the outlet of Lake Chicago, during its early stages especially, was southwestward through the broad, flat-bottomed channel cut by the escaping water. The outlet channel, now followed by the Des Plaines River, was called the "Chicago Outlet" before Leverett applied the name of Lake Chicago. The gradual deepening of the outlet, shifts in the position of the ice front, occasional inflow from others of the Glacial Great Lakes, all served to affect the altitude of the Lake levels and to enable wave erosion to start at some new point to erode the shores. Later in the history of the region, the land once wholly covered by the ice began a slow upwarp which further affected the levels of the Lakes and the directions of drainage.

Lake Chicago gradually increased its area as these changes continued until its waters mingled freely with the waters of the other Glacial Great Lakes. The Chicago outlet was abandoned and drainage was to the north and east through several shifting lines of general discharge for all of the Lakes. The shoreline remnants of the ice-ponded lake are so extensive and well enough developed to enable students of the subject to assign about seven "stages" to the involved history of the Lake. Dr. F. C. Baker has combined a study of the physiographic features of the old shorelines with the study of the faunal record left in the sediments deposited at the various levels. Using the local names suggested by earlier students and applying several others, Baker has designated the stages as arranged in the following table:

Name of Stage	*Approximate level above the sea*	*Approximate level above Lake Michigan*
Glenwood (Glenwood, Illinois)	640 feet	60 feet
Bowmanville (Bowmanville, Chicago)	590 "	10 "
Calumet (Calumet, Indiana)	620 "	40 "
Toleston (Toleston, Indiana)	600 "	20 "
Sag Low Water (Sag Feeder, Illinois)	590 "	10 "
Hammond (Hammond, Indiana)	600 "	20 "
Englewood (Englewood, Chicago)	592 "	12 "

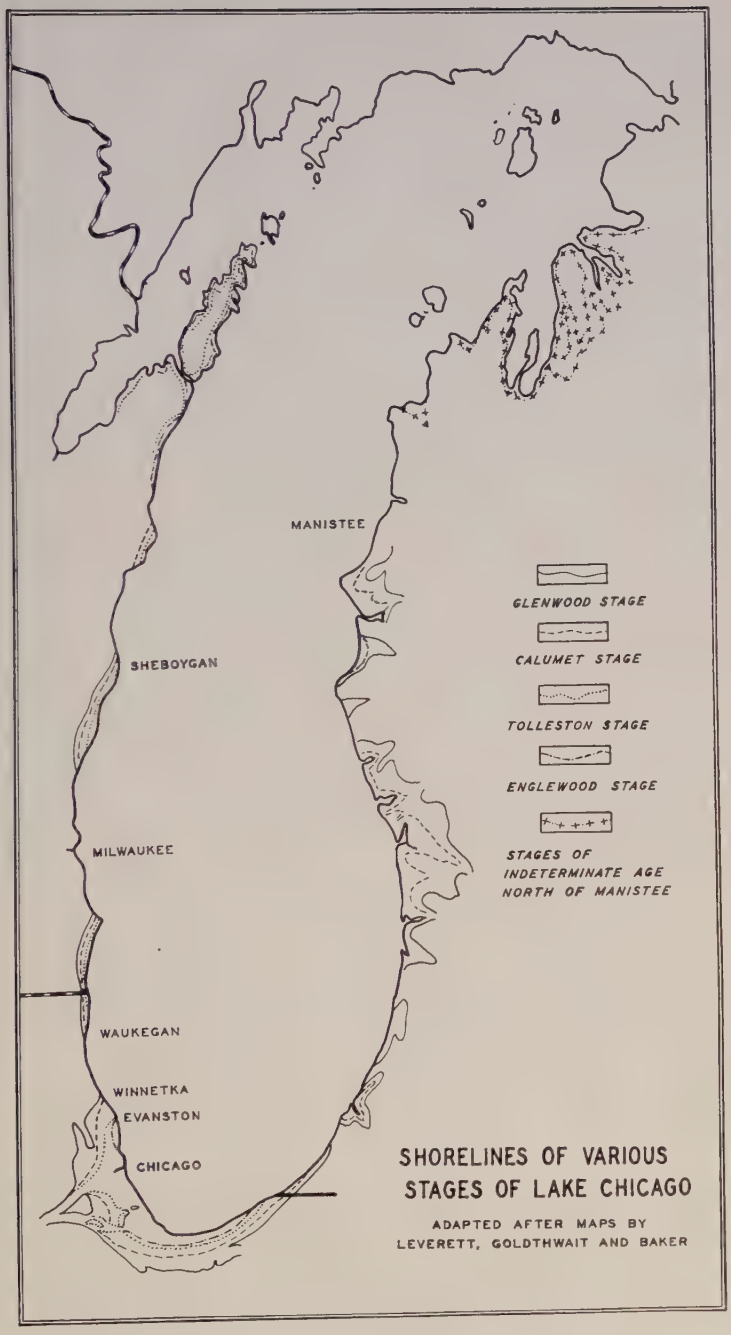
For practical purposes the elevation of Lake Michigan above the sea generally is assumed as 580 feet. Records show that for some years the level of the Lake has been slightly lower, about 578 feet.

Also it generally has been assumed that Lake Michigan began its history at the time of the complete disappearance of the ice and late in

the progress of crustal readjustments. The various stages of Lake Chicago were attained, however, during the slow wastage of the ice and the time for Lake Chicago roughly may be regarded as about equivalent to the time consumed in the disappearance of the ice, possibly 25,000 to 30,000 years. Elsewhere in the world, man had reached his age of "polished stone," the Neolithic, somewhere within the time indicated above. Our interest, however, now concentrates on the west shore of Lake Michigan, an arbitrary selection of one of the longitudinal shores of the Lake. Seven to ten thousand years ago, let us again assume, this shore stretched northward probably in a much more irregular line than its present smooth curves. Obviously, also, this "original" shore of the Lake was situated east of all the shores of Lake Chicago which were made at higher levels (See above table). The present gaps in the extension of those shores is evidence that the Lake Michigan shoreline has not remained static. It has receded westward truncating the eastward swinging arcs of Lake Chicago's shoreline and has established gentle concavities westward in its own shore. This accounts for the gaps in the Glenwood and other higher shorelines between Winnetka and North Chicago and between Wind Point, Wisconsin, and Fox Point, north of Milwaukee. Still longer gaps in the ancient shorelines exist north of Sheboygan, Wisconsin.

The evidence of wave attack presented by the retreating line of cliffs is accompanied by another erosional feature, the wave-cut terrace. This is a subaqueous bench or platform gently descending lakeward to the depth point where the oncoming waves have no erosional power. The landward margin of the terrace is usually concealed by the beach sands, but in storms of exceptional severity the beach debris may be swept away entirely and the beveled material of the terrace becomes exposed. In many places the veneer of beach sands is so thin that the composition of the terrace is quite apparent. It is generally the same as the material rising in the cliff, and, where the gaps in the ancient shoreline of Lake Chicago exist, it is the unassorted boulder clay of glacial deposition. The gentle descent of a shore terrace may be recognized readily in some of the soundings of the Lake Survey charts but what part of the gradient reflects actual erosion and what part is due to the even deposition of sand and gravel is not always a matter of ready determination. Further study of lake bottom materials and more positive recognition of actual bottom erosion will develop further evidence for the linear extent of shore recession. Existing uncertainties do not invalidate the fact of shore recession and so attention is now directed back to the cliffs produced by the tossing waves which beset LaSalle and his men.

The nature of the wave attack which results in over-steepened cliffs and in slow landslide movements down the face of the cliffs is familiar


MANISTEE
SHEBOYGAN
MILWAUKEE
WAUKEGAN
WINNETKA
EVANSTON
CHICAGO
GLENWOOD STAGE
CALUMET STAGE
TOLLESTON STAGE
ENGLEWOOD STAGE
STAGES OF INDETERMINATE AGE NORTH OF MANISTEE
SHORELINES OF VARIOUS STAGES OF LAKE CHICAGO
ADAPTED AFTER MAPS BY LEVERETT, GOLDTHWAIT AND BAKER

to every student of geological processes. As the waves move shoreward their vertical oscillations are interrupted if the offshore waters are shallow, and the mass of water in the broken waves is hurled against the shore. Subsequently, this water in a shallow, swiftly moving sheet flows lakeward again in the dragging movement known as the "undertow." If the water is deep at the shore and the base of the cliff submerged, the wave oscillation is not broken, but the pressure and energy of wave motion are exerted directly against the material of the shore with considerable effectiveness.

In this constant hammering the water of the waves is carrying the resulting debris as a further tool of erosion. The larger rock particles are dragged by the incoming wave and the bottom offshore is swept and scraped by this action. At the point of impact with the shore the waves tend to cut a more or less vertical notch, which sometimes becomes concave landward, so that the cliff is undercut. Hence, material in the upper part of the cliff is unsupported and eventually falls to the base at or near the water margin. Here, then, a mass of new earthy material, conveniently within the reach of wave action, is reduced to smaller disintegrated fragments suitable for transportation in and out by the waves and undertow.

If this loose material were allowed to remain in one place, approximately, the effectiveness of the wave attack would be greatly nullified. But the waves frequently approach the beach at various angles, while the undertow invariably leaves the shore in a direction at right angles to it. Hence, there is an alongshore distribution of debris that prevents an excessive piling up of material at any one place. Many observers have recognized a decided tendency on the west shore of Lake Michigan for the waves and littoral currents to shift sand and gravel southward. Evidence for this is seen in the southerly drifts of material across the mouths of streams, frequently deflecting them strikingly to the south before their waters reach the Lake. In the same manner the beach area on the north side of jetties and piers is frequently piled high with gravel and sand which build outward from the shore on the exposed side of the piers. A similar shifting of shore materials to the south is thought to be evident on the east shore of the Lake. The gradual manner in which the waters deepen off the Chicago waterfront has been cited also as evidence of a southerly transportation of beach debris along both shores of the Lake. Other opinions hold, however, that all the sand in the Indiana dunes has not been transported, necessarily, from the north shore of the Lake. Because of the considerations introduced by Hough, it apparently is becoming more difficult to decide what disposition will be made ultimately of the alongshore drift. He finds that the increasing size of sand grains in the beach from Evanston to the Dunes is contrary to the assumption that continued

Site of the former settlement of St. Johns (1845-1855) near Highwood, Ill. Land-slide debris derived from the distant bluff of boulder clay spreads over the beach in the mid-view.

transportation of the grains would reduce them in size in the locality towards which transportation trends.

The fact most readily recognized, however, is that the shore where unprotected has not remained in a fixed position, but has retreated before the undermining attack of the waves. One of the first recorded instances of this retreat was noted near Milwaukee by Lapham, in 1847, when during an interval of nine years a road became impassable due to the retreat of the shore. Lapham made no estimate of the extent of this retreat but noted an opposite effect in Chicago where sand accumulated on the north side of a pier to the extent of 720 feet in five years (1835-39). Other investigators, particularly Dr. Edmund Andrews of Chicago, followed with observations of the extent of Lake invasion. His extensive studies indicate that the retreat of the Illinois-Wisconsin shore, for a distance of about 180 miles through periods ranging up to 35 years was at an average rate of about 5.28 feet per year. The subsequent studies of W. E. O'Brien in southeastern Wisconsin, L. F. Pope and P. R. Hoy near Racine, Jerry Donohue near Sheboygan, and others are in practical agreement with Dr. Andrews' average, excluding the exceptional periods of 1905-1907 and 1918-1921 when the lake level was unusually high.

Obviously, the establishment of many jetties, piers, and bulkheads has modified the observed rate of recession greatly. But, as is well recognized by many, the mere installation of protective devices does not insure, necessarily, a given part of the shore for all of the future. Sydney M. Wood recently has pointed out that in many instances

scour will continue to take place on the lee side of a jetty, and the bluff will be eroded at that place unless provision is made to distribute the beach material on both sides of the protective device.

Thus the shore line of Lake Michigan presents one of the great problems confronted by the builders of Chicago and the Lake suburbs and by North Shore property owners. The problems of shore protection are now shared by municipalities, industrial concerns, the Federal government, and by the individual. The municipalities in civic improvements have made the water front largely recreational areas so that the present usage of the shore line in the Chicago region is as follows: by individual owners, 59 per cent; recreational and parks,

View in Wisconsin showing active wave erosion during present low stage of the Lake.

26 per cent; industrial and commercial, 10 per cent; United States reservations (not including lighthouses) 5 per cent.

The chief residential portion of the Illinois shore line lies north of Chicago, including in the city the shore area from Foster Avenue to Howard Street. The land values along the North Shore vary with distance from Chicago, of course, but may rise to a valuation of from $350 to $450 per foot in suburban properties. Where the Lake makes serious inroads into land of this valuation, expenditures for protective devices and for their repairs may approximate from $40,000 to $80,000 in individual cases.

The value of the land and the importance of preserving it is reflected, therefore, in the number and kind of protective devices utilized alongshore. The average distance between groins or piers along some stretches of particular exposure may range from 250 to 400 feet. A recent census of the various devices, effective or partially destroyed,

shows that about 450 devices of several types have been or are now in use along the Lake front between Thorndale Avenue and the harbor of the Public Service Company's plant in Waukegan. This count probably falls short of the gross amount because some of the smaller groins may be concealed entirely by the accumulation of the beach sands. Not including the cost of pier constructions by municipalities and by the government, the possible expenditures represented by this census, the cost to individuals, approximates more than $1,500,000 at present costs of installation and repairs. This estimate takes into consideration only the smaller box piers, wood and steel jetties, and abutments of wood and steel.

Harbor of Port Washington, Wis., looking south. North sides of jetties banked high with beach material, but erosion on south side of second jetty is eating past the landward end.

In Chicago, that part of the Lake front between Foster Avenue and the northern limits of Jackson Park is now fashioned largely in accordance with the provisions of the Chicago plan. Along this stretch when the project is fully completed, some of the results will be the addition of fully 2,000 acres to the waterfront area, extending a part of the made land fully a quarter of a mile lakeward and installing improvements of from $70,000,000 to $75,000,000 in value. In effect, a project of this kind is a measure of shore protection and represents man's decided gain against the piracy of the waves. The change effected in the new salient of the shore may result in some additional efficiency, locally, against the wave attack, and as a precautionary measure, a bulwark of huge stone blocks has been erected along the present new shoreline in the immediate vicinity of Jackson Park.

Where industrial plants occupy a portion of the shore the construc-

tion of their buildings is sometimes the same in effect as the building of docks and breakwaters. In certain cases some plants are maintaining the stability of the shore by dumping slag and cinders into the Lake as in the vicinity of Waukegan and in the district south of 79th Street. The United States government contributes materially to shore protection where breakwaters and lighthouse piers have been established. Both the Chicago and Waukegan harbors have long been regions of conspicuous prograding of the shore immediately north of the breakwaters. The southern portion of the shore line of the Fort Sheridan reservation was once a region of active erosion and the cliffs there still lack a plant covering. However, the beach has grown to a width of 150 feet in the vicinity of the vanished village of St. John. The government has not been required to expend any funds recently for shore protection on this reservation, but, on the shore of the Great Lakes Naval Training Station, farther north, extensive protective measures have been installed. Partly to maintain the harbor, and partly to protect the lake cliff, the breakwater and groins north of it represent approximately an expenditure of $1,065,000 at the time the improvements were made. Thus along the Illinois shore line, the cost of shore protection approaches the magnitude of $100,000,000.

Estimates of expenditures for shore protection in Wisconsin have not been sought except in the case of Kenosha where significant measurements were made by the writer in the period between 1918 and 1929. For this region, Robert M. Smith, City Engineer of Kenosha, kindly supplies the information that expenditures for highway improvements and permeable groins in and north of the City aggregate the amount of $192,168.

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On Scientific Collecting*

Edward R. Ford

A FORMER member of the Illinois Audubon Society recently resigned because its affiliate, the Chicago Academy of Sciences, collected birds for scientific specimens. There is no subject under the sun but must engage a difference of opinion. A just and temperate person will respect an opposite view. So do we now with respect to that of our former member. However, it now seems proper to present our ideas of the matter.

When shall man cease to destroy Nature? Shall it be when she has met his physical requirements—when her forests have been cut, her rivers diverted, her swamps drained? When her rich meadows have been made arid and her beasts, feral and domestic, have been killed for food and raiment? Or shall it be when his intellectual needs, too, have been answered? What of knowledge? What of books and pictures? The destruction of trees for the pulpwood out of which a "bird book" is made may result more disastrously to continuing bird populations than the killing of the specimens required by the artist for its illustrations.

There is too much complexity in human affairs, especially as they affect Nature, to cast out that which has not been proved worthless. Crows and wolves must not take possession of the land. Neither is it well to extinguish them, knowing no more than we do of their place. Lumbermen and engineers must not take possession of the land. Neither should their kind utterly perish. So, too, of men whose devotion is to natural history and the maintenance of museums by which its studies are possible.

Without natural history museums there would have been no Ridgway, no Chapman, no Fuertes, no Forbush, no Eaton, no Florence Merriam Bailey, no Roberts, no Bent, no Howell. Without the knowledge which these have made available it is questionable whether Audubon societies would flourish as at present. It is certain that they would not exist save for Audubon, whose name they bear, not because he killed birds but because he delighted in them.

It may be fairly conceded that those who contribute the largest sums to the work of Audubon societies are able to do so because without malice, but inconsiderately and perhaps unwittingly, changing the face of thousands of acres of land, they have destroyed the habitats of many disappearing species. They who destroy would fain protect. If this is true of some industrialists may it not be true of some scientists? It *was* true of Audubon.

*Reprinted from *The Audubon Annual Bulletin*, No. 28, 1938, Illinois Audubon Society.

Meeting of Amateur Herpetologists

The need for amateur groups in many fields of study is being called to our attention more and more by the increasing number of queries received at the Academy and other Chicago institutions of similar nature. It is our hope to encourage as many of these various interests as possible and to assist in the organization of small groups of amateurs interested in various fields of natural history.

The increased interest in reptiles—or more properly the additional signs of interest—since the conversion of the Lincoln Park Aquarium into a Reptile House, and the appointment of E. Gustav J. Falck as Curator of Reptiles in the Park, has made us more conscious of the need for a clearing house for ideas and the advantages of the added interest and enthusiasm to be obtained through intercourse of people with the same hobbies.

At the invitation of Walter L. Necker of the Academy staff, and E. Gustav J. Falck of the Reptile House, there will be an informal gathering of people interested in field or terrarium studies of reptiles and amphibians Thursday evening May 26 at 7:30 P. M. in the auditorium of the Academy. Everyone interested is invited to attend and to contribute ideas or exhibit photographs or specimens. We particularly invite those who may care to bring with them any of their animals, but we should like them to make previous arrangements with Mr. Necker at the Academy, either personally or by mail, so that proper space may be reserved.

There will be no special program, except that short talks of about ten minutes each will be made by representatives of various local institutions who are in a position to aid terrarium friends in one way or another, as are the staffs of the museums and zoos so that they will be better known to local amateur naturalists. Among the speakers will be Dr. Howard K. Gloyd, Director of the Academy, and Walter L. Necker, also of the Academy, E. Gustav J. Falck, Curator of Reptiles, Lincoln Park Zoo; Karl P. Schmidt, Field Museum, A. S. Windsor, General Biological Supply Company, and others. It is hoped, however, that the principal benefit to those attending will be meeting with fellow-terrarium-fanciers, and the consequent mutual interchange of ideas and problems—and perhaps specimens. We invite special requests, in the way of questions, which may be answered during the semi-formal addresses or afterwards individually.

If sufficient interest is aroused in the continuance of regular meetings devoted to various phases of the study of reptiles and amphibians, we shall be glad for suggestions leading toward a more formal and permanent organization.

Getting Acquainted With the Mosses

Grace R. Meeker

SOME years ago, when Minnie Reed was making her *Key to Kansas Mosses*, she asked me to collect material for her. My letter in reply stated I did not know one moss from another, yet I would be glad to do what I could. At her suggestion, I made my packets in duplicate, numbering them so she could send me the names on a postcard. She seldom did so, more often there came back a tiny packet in a letter saying, "In with No. 3, please send more."

Very soon my interest became so great I determined to do what I could to really learn about mosses. My collecting ground was ideal, woodland and prairie, sandstone and limestone outcrops, spring-fed and rocky streams—yes, in those days we really had rain in Kansas. I found here I had a branch of botany, of which I had long been a student, that a busy farm woman might study in the winter time.

Mr. B. B. Smyth, one of our best botanists, lent me a copy of "Lesquereux and James." Can you imagine a beginner struggling to make headway with this difficult manual as a guide? Professor E. A. Popenoe, with whom I had studied botany in school, and who continued to be interested in my endeavors to keep on alone, gave me the necessary hieroglyphics to secure the kind of hand-lens used by the entomologists.

I found I had to clear the boards of all other activities before I set myself at the new study. No use examining a moss while the bread was in the oven. For the fascinating new interest, at least for me, required undivided attention. But how I enjoyed it! And how many things I learned to recognize not mentioned in the books. When the striations of the teeth of the peristome revealed themselves under my lens I would cry out, "Why it's a *Bryum*"—there being no one to hear me.

The whole family became interested—my father, out after the cows, reported a beautifully green patch of moss in the north pasture, on the root of the little elm tree where the brook made a tiny fall. Naturally, I was off as soon as the dishes were washed and how I wondered when my careful fingers lifted a generous piece to see green particles in myriads fall upon the soft mud. I never took my precious lens afield for fear of losing it, so had to wait to investigate until the return to the house. Then I found my moss was *Webera* in its unusual reproductive form. Material sent to Dr. Grout was reported correctly named and later I sent him a shoe-box full for his specimen packets.

A common hair-cap moss *(Pogonatum)* of eastern North America.

Having struggled with Lesquereux and James, Dr. Grout's first book *Mosses with a Hand-lens*, seemed elementary. Later I secured a copy, published in parts, of his *Mosses with a Hand-lens and Microscope*. It was my extreme good fortune to go to Staten Island and receive one of the parts in person from Dr. Grout, himself. I had picked up a wonderfully fruited moss in Bronx Park, offering it to Dr. Grout, he said "*Ceratodon*," tossing it into a waste basket. And I had never seen it before!

You will have guessed that my moss study brought me correspondence, exchanges and all kinds of friendly help from those who loved the mosses. Dr. Holzinger sent me a fine box of named specimens collected in Colorado. My family protested they had to drag me away from those unexpected mountain bogs, where bryophytes abound.

An inquiry for an exchange came from Göteborg, Sweden. The card was in English. I was addressed as "Dear Sir." My reply was typed and as business-like as I knew how to make it, signed with initials. Several most interesting packets came, some containing the same species as grow here but very much larger, indicating the more favorable environment in which they grew. Then came a note addressed "Dear Madam"—and that was the last. I am glad I had sent a very desirable set of specimens with which to close the exchange.

As a member of the Sullivant Moss Society I have enjoyed for years reading *The Bryologist* and in its latest issue read an account of a search extended over 20 years for a certain species of *Physcomitrium*. It reminded me of my own, less extended, search for *Physcomitrium kellermanii*, named by Mrs. Britton from material submitted by Minnie Reed, in honor of Dr. W. A. Kellerman then connected with our Kansas State College. At last I found it and had the determination confirmed by Dr. Holzinger. Miss Reed also found *Fissidens kansana* readily located in my own collecting ground.

When this locality was no longer my home, I found it less easy to keep on with moss study. Mosses attracted me, yes, whenever I was abroad in woods or fields—but so often they were not fruiting or not developed enough to be studied. Then the notion of fixing up a "Wardian Case" came into my mind. I had grown polypodies and resurrection plants in a moist chamber, so why not mosses? The dime store readily supplied an old fashioned glass butterdish with a lid and the rest was easy. A layer of sand, a few tiny ferns, when eastern friends were kind, some plants of red-berried *Mitchella repens*, with my precious mosses and I had a little winter garden that was attractive as well as instructive.

Even during these dry years I still have my bits of moss growing in the moist chamber; lacking ferns I tucked in the tips of sweet potato. My offer to collect and send specimens of Kansas mosses still holds good, and I have faith to believe that there will come again plenty of moisture and the lovely little groundlings will again greet us in wood and field; or tuck themselves away in crevices of the bark of trees, and, clinging to the rocks, appear as long streamers in the rills as they did when I began to get acquainted with the mosses.

GRACE RUTH MEEKER through many years' study of living plants in the field has become one of the best botanists of the Middle West. Her interest in mosses began soon after her college days and the bryophytes are still closest to her heart. As librarian in the public library of Ottawa, she gave sympathetic encouragement to the eager young naturalists of that Kansas town. To her they owe much—these young men and women who have taken up scientific careers, for she helped to smooth the way. Now retired, Miss Meeker devotes herself to her garden, gives talks on wild flowers, birds, and Kansas history, but still finds time for trips afield with hand lens and binoculars.

MUSEUM ACTIVITIES

Museum Improvements

During the past winter a new floor covering of asphalt asbestos tiling has been laid in the main exhibit hall of the Museum. This greatly improves the appearance of the second floor and provides a truly beautiful setting for the Chicago Environs groups.

Six new table-cases have been installed on the second floor. Although the material exhibited is not yet in a permanent arrangement, the plan to be followed is laid out in a general way. The first case at the head of the stairs now contains specimens of the poisonous snakes of Illinois, reproduced in celluloid, and samples of various outfits for giving first aid in cases of snake bite. Also shown are some of the stages of making a cast of a snake for exhibition purposes. A continuation of this exhibit will include representatives of the amphibians and reptiles of the Chicago Area. Another case contains a display contrasting recent books and journals of herpetology with some of the earliest known works on the subject. The latter include descriptions and illustrations of fantastic sea monsters and legendary dragons along with some of the animals now well known.

To the north of the middle cases are displays of molluscs in which certain features of the biology of this diversified group are illustrated. The different types of shells, variation in color and structure, and general habitat relations are shown. This is followed by a survey of the five classes of Mollusca: the chitons (coat-of-mail shells), the snails, the clams, the scaphopods (tooth-shells), and the cephalopods (squids, octopuses, and chambered nautilus). In another case is a representative series of the molluscs of the Chicago Area. These specimens constitute but a small part of the large study collection of molluscs, world-wide in scope.

The two cases in the south end of the hall contain fossils of the Chicago Area —crinoids, annelids, brachiopods, molluscs, and trilobites of the Silurian Age from the Niagaran Limestone of the Chicago bedrock found in quarries near the city. There is also a rather complete collection of ironstone concretions from the Mazon Creek area of the Illinois coal fields, seventy-five miles south of the City. This Mazon Creek exhibit is especially noteworthy since it contains in a beautiful state of preservation some interesting plants and invertebrates such as king crabs, millipedes, shrimps, clams, and cockroaches not commonly found as fossils.

On the third floor a new wall built across the south end provides for the construction of ten new exhibits of a modern design. The groups to be installed are to show environmental associations of animals and plants. For example, a typical marsh, a bog, a prairie, and various types of woodland and aquatic habitats may be included. During the planning and building of the exhibits this space is being used for temporary displays of photographs, paintings, etc.

The systematic collections on the third floor are also being revised and rearranged with the plan of making them more meaningful to the general public, and more helpful to teachers and students. The staff will welcome suggestions from teachers with reference to making these displays more suitable for their use.

A group of Snowy Owls, one of a series of new exhibits under construction for the Field Houses of Chicago Parks

New Exhibits for Field Houses in the City Parks

In cooperation with the Chicago Park District the Academy has under construction a series of medium-sized habitat groups of birds and mammals for display in the Field Houses of the City Parks. In cabinets built by the Park District, the specimens, backgrounds, and accessories are now being installed by members of the preparations staff. These cases, 43 by 52 inches in size and 23 inches deep, accommodate fairly large exhibits and are at the same time portable so that they may be moved from time to time to various parts of the City. The large numbers of visitors to the Parks may thus have the privilege of enjoying the entire series.

The Library

The library of the Academy is now being reorganized for the first time since 1917 when the then existing library of about 75,000 pieces was presented to the John Crerar Library. Although a great central repository for literature on the natural sciences is of undoubted advantage to the naturalists of the City, the need for reference material close at hand is greatly felt by members of the Academy staff. Endeavors are now being made to supply the primary requisites in the way of books and periodicals, especially in vertebrate zoology.

Walter L. Necker, acting Librarian, has arranged and accessioned the entire present library and has nearly completed a card index to the collection of about 1000 books and 2500 separata. In

this index it is hoped to include cards for the personal libraries of the Director and the Librarian, thus increasing the available literature by about 2000 books and 10,000 pamphlets.

Special desiderata at present are semi-popular journals and magazines. Through friends of the Academy partial sets of the *Journal of Heredity, Quarterly Review of Biology, Science,* and *Scientific Monthly* have been presented to the library. Members having publications on natural history which they may wish to turn over to the Academy are invited to correspond with Mr. Necker.

The use of the scientific library is one of the privileges of membership in the Academy and members are invited to call upon the Librarian for suggestions with respect to selecting books for their own collections, or for assistance in finding literature in the fields of their particular interests.

The Simons Memorial Gift to the Library

The Academy is fortunate in receiving as a gift from Mrs. Carrie Simons five sets of books from the library of her husband, the late Joseph Simons. These include the best edition of W. H. Hudson's *Birds of La Plata,* illustrated by Gronvóld (Dent & Sons, 1920, limited to 200 signed copies) which is certainly one of the most readable and enjoyable books on the bird-life of South America; *A History of British Birds* (6 volumes, 1860-1862) by F. O. Morris, as well as *Natural History of the Nests and Eggs of British Birds* (3 volumes, 1875) by the same author; G. E. Shelley's *Birds of Africa* (5 volumes in 7, 1896-1912); and the five magnificent folio volumes of Gould's *Birds of Great Britain* (1873). Among the most beautifully made of all books on birds, this set of Gould with its superb folio plates has been examined over and over again with the greatest pleasure by members of the staff.

The Simons Memorial collection will not be merged with the regular library. A special cabinet has been built for these books so that they will be kept in perfect condition. Some of the volumes of Gould's *Birds of Great Britain* are now on display in one of the new cases on the second floor. We invite members of the Academy to look at these volumes especially.

The 1938 Annual Meeting

The Eighty-first Annual Meeting of the Academy was held in the auditorium on April 11. The president's address of welcome by Francis R. Dickinson was followed by the reports of the Treasurer, Secretary, and Director. An amendment to the constitution modifying Sections III and IX with reference to memberships was passed.

The following officers were elected: Dr. Nathan S. Davis, III, President; Tappan Gregory, First Vice-president; Dr. Edmund Andrews, Second Vice-president; C. Blair Coursen, Secretary; Carroll H. Sudler, Trustee, and Francis R. Dickinson, Orpheus M. Schantz, and Dr. James P. Simonds, Scientific Governors.

The guest speaker was Dr. Carl L. Hubbs of the Museum of Zoology, University of Michigan, who gave an interesting illustrated lecture, "Fish Collecting in Desert and Jungle," describing his studies on speciation in the fishes of the arid regions of the western United States and in tropical waters of Central America.

At the close of the meeting guests were invited to inspect the new improvements in the second and third floors of the Museum.

Naturalists of the Frontier

By Samuel Wood Geiser.

University Press in Dallas, Southern Methodist University, 1937, 8vo, cloth, 341 pages, frontisp., 10 maps. $3.00.

If while speeding over the concrete ribbons reticulating the map of Texas today you can hear the thunder of a million hoofs on unbroken prairie sod, the fusillade of bull-whips urging fagged oxen with heavy wagons; if you can see Comanche smoke-signs from behind a distant hill; if the perfume of huisache, pervasively delicate after a shower, makes your heart beat faster—you will enjoy this book. If in addition you have some slight bent toward the history of natural history, you will be held by every page.

The ten men whose lives and accomplishments form the subject of these essays (Boll, Berlandier, Drummond, Ervendberg, Lindheimer, Roemer, Wright, Lincecum, Reverchon, and Belfrage) are among the most interesting of the naturalists who worked in the American Southwest between 1820 and 1880. In describing their careers and evaluating their contributions to scientific knowledge the author has dealt with them sympathetically but objectively, revealing alike their strength and their frailties, and with a mastery of stroke that could result only from thorough, painstaking research, he paints a background of historical, economic and cultural detail in front of which the drama of each life moves. He has given us much more than a series of vignettes; he has given us a vivid picture of early Texas. He emphasizes the fact that here the frontier of scientific exploration tended to correspond with the social frontier and that "while the naturalists of the Texas frontier are of interest to the historian of science primarily because of their work in extending the bounds of knowledge in various fields of natural science, their careers must be considered always in the light of their social environment. . . . Social conditions in early Texas offered many obstacles to the naturalist's work; and for any but the narrowest view of the ten men . . . selected for discussion, their failures are of almost as much interest as their successes. While their achievements are due largely to traits of character inherent in the men themselves, their failures were due in almost every case to the environment."

Dr. Geiser's admirable literary style, the restrained use and careful selection of quotations from journals and correspondence, make this book delightful reading. The frontispiece is a portrait of Jacob Boll of Dallas, "a man who by his character and personality as well as by his scientific achievement deserves to stand first among his fellows." An outline map of Texas showing the areas explored accompanies the account of each naturalist whose work is described in detail, and that each biography is fully documented is shown in Appendix A. Appendix B is a briefly annotated list of 153 naturalists active in Texas between 1820 and 1880. An index of names closes the neatly bound and attractively jacketed volume.

For this work I have only praise. Any unfavorable comments that could be offered would be too trivial to mention. My pleasure in reading it was so great that I wrote Dr. Geiser, whose guest I had the pleasure of being a few years ago, expressing my enthusiasm. With unmistakable earnestness he asked for apposite criticism. Willing to oblige, I read it again, striving to maintain an attitude of animadversion. It was of no avail. For this book I still have only praise!—H. K. Gloyd.

Giant Fishes, Whales and Dolphins

By J. R. Norman and F. C. Fraser

W. W. Norton & Co., New York, 1938, xiii, 361, 8 colored plates, numerous illustrations, $4.00.

There is a great need, and yet a surprising scarcity, of books which may serve the traveller as "Baedeckers" to the natural resources and phenomena of the regions through which he travels. For—although the cities of the world may superficially appear different, and all the lands and waters similar—to the initiated there is yet a greater interest, a greater variety, in the changing aspects of the plains and oceans, which may at first appear monotonous and desolate. The U. S. Geological Survey Guide Books of the various major rail systems serve admirably to acquaint the traveller with the ever-changing geological panorama as his train speeds across the continent —a more dramatic and vital course in geology is presented by no university —but these are the exceptions in the realm of books.

Messrs. Norman and Fraser of the British Museum (Natural History) have in fact produced this "Baedecker" to the Oceans, for the sea-going traveller whether he be sailor, sportsman or tourist, amateur or scientist. The minimum technical essentials are incorporated in the introduction, primarily for facilitating the use of the two keys which are exceptionally usable for the layman. Naturally only a relatively small part of the entire ocean fauna could be treated in a book of this size and scope, so that an arbitrary minimum length of six feet was chosen for the fishes treated, except that such smaller forms as flying fishes and remoras, which are so frequently observed, are also included. Where there is but slight variation in a Family or Genus the forms are treated under those categories, but the better known, prominent species are individually described. For a book which is necessarily a catalog of a large number of animals, the descriptions are particularly attractive in that much space is given to the life histories of the animals concerned, their economic importance and history, without in any way neglecting the physical description and range. The illustrations by Lt. Col. Tenison, both colored plates and line drawings, are excellent for identification.

On the whole, the book is to be recommended not only for reading by those who are likely to travel, but by anyone interested in a wider knowledge of an interesting fauna which is but poorly known and about which there is much popular misconception. Its usefulness as a reference book, however, is not to be overlooked since the authors successfully accomplished their purpose of writing a handbook which will answer the vast majority of questions which are likely to be asked about this giant "Oh my" fauna of the seas.—W. L. Necker.

Birds Against Men

By Louis J. Halle, Jr.

Viking Press, New York, 1938, 228 pages, $2.50.

A small book of seven delightful essays about birds—really more about nature in which birds and men are merely actors, and the birds perhaps the more forceful personalities. The author is an observer of nature, has felt her deeper secrets, and does not write in the vein of a "sentimental birdlover," but in a tone of quiet admiration which is yet instilled with a contagious fervor for the characters he describes.

The variety of essays is sure to please any reader who has felt the thrill of nature. From the dawning of a New York Spring to the character of Lorenzo, a pet parrot; from the inspiration of the southern ocean and its avian denizens to the spirit of a pigeon roost; from the quiet and fearful majesty of the Mayan jungles to experiences with falcons and studies of a pair

(Continued on page 32)

THE NATURALISTS CALENDAR OF EVENTS

This department aims to bring together a chronological list of events and activities of general interest to naturalists of the Chicago Region. Organizations not represented in this issue are invited to send us their announcements for future numbers. For more detailed information write or telephone the office or representative of the organization in question.

Chicago Academy of Sciences, Lincoln Park at Clark and Ogden Ave., Diversey 5871.

Chicago Aquarium Society, Mr. Herman Green, Secretary, Plaza 2088. Meetings at the Harvey Restaurant, Strauss Building, third Wednesday of each month.

Chicago Cactus Society, Mr. Frank K. Balthis, President, Garfield Park Conservatory, Van Buren 8100. Meetings last Sunday each month, Garfield Park Conservatory, 3:00 P. M.

Chicago Entomological Society, Mr. Alex K. Wyatt, Secretary, 5909 N. Virginia Avenue, Ravenswood 3115.

Chicago Ornithological Society, Mr. Rudyerd Boulton, President, Field Museum, Wabash 9410. Meetings third Tuesday each month, Crerar Library, 8:00 P. M.

Friends of Our Native Landscape, Miss R. B. Eskil, 6016 Ingleside Avenue.

Geographic Society of Chicago, 7 S. Dearborn, Randolph 5293. Resumes meetings in October.

Illinois Audubon Society, Chicago Academy of Sciences, Diversey 5871.

Men's Garden Club of the Chicago Region, Mr. O. V. Morgan, 404 Washington Street, Elmhurst, Secretary. Meetings second Thursday each month.

Mid-West Horticultural Society, Administration Building, Garfield Park, Van Buren 8100. Meetings last Friday each month.

Prairie Club, 38 S. Dearborn Street, Dearborn 3737.

State Microscopical Society of Illinois, W. L. Necker, Chicago Academy of Sciences, Diversey 5871.

May 22 Chicago Ornithological Society Field Trip, Riverside. Meet at end of Garfield Park and Westchester—Maywood "L" at 10:00 A. M.

May 26 Meeting of Amateur Herpetologists, 7:30 P. M. Academy Auditorium.

May 27 Mid-West Horticultural Society, Administration Building, Garfield Park, 8:00 P. M.

May 28 Prairie Club walk; Lisle-Belmont (Arboretum) 5-6 miles.

May 29 Chicago Entomological Society Field Trip. Start near Hessville, Indiana; to Miller and Fremont, Indiana.

May 29 Chicago Cactus Society, Garfield Park Conservatory, 3:00 P. M.

May 30 Prairie Club walk; (Memorial Day) Lake Geneva, 5-6 miles.

June 4 Prairie Club walk; Edgebrook Circle, 5-6 miles.

June 5 Chicago Ornithological Society Field Trip. Morton Arboretum, Lisle, Illinois.

June 9 State Microscopical Society Lecture: *The Microscope in Crime Detection,* H. J. Walter, Academy Auditorium, 8:00 P. M.

Mr. Herbert J. Walter of Chicago, "Examiner of Questioned Documents," was selected for this occasion because of his outstanding ability, indefatigable integrity, pains-taking care and long years of professional activity in this field. Mr. Walter originally came from London, England, to Winnipeg, Manitoba, where he was engaged in questioned document work for some time. From there he moved to Chicago where for years he has been a respected citizen of the United States.

It will be recalled that Herbert J. Walter was called upon to render "expert testimony" in the Hauptmann Trial (Lindberg Kidnapping Case) at Flemington, New Jersey. He also rendered valuable service in the "Al Capone, Income Tax Evasion Case" for the United States Government.

In this lecture Mr. Walter will describe the application of various microscopical, photo-micrographic, and photographic instruments and apparatus to the critical examination of questioned documents. He will also present a partial review of evidence presented in the Hauptmann trial, including not only some of his own findings but those of Albert S. Osborne of New York and other specialists in this field who were active at that trial.

June 11 Prairie Club walk; Lamont, Palisades, etc., 5-6 miles.

June 11-12 Friends of Our Native Landscape. Annual Meeting to the Full Leaf in the projected addition to the Fox Ridge State Park near Charleston, Illinois. Kenneth Sawyer Goodman's masque, *The Beauty of the Wild,* will be presented at sunset on June 11. Address by Jens Jenson. For more details —Edison L. Wheeler, 224 West Huron Street, Chicago.

June 12 Prairie Club walk. Waukegan Moorlands (Picnic), 10 miles.

June 15 Chicago Aquarium Society. Talk by Carl Jensen.

June 18 Prairie Club walk, Golf to Winnetka, 5-6 miles.

June 16-25 Nature Study School in the Dunes sponsored by The Friends of Our Native Landscape. Lectures and conducted field trips by scientists from leading institutions of Chicago. Indoor meetings at the Dune Acres Club House, near Indiana Dunes State Park.

June 21 Chicago Ornithological Society, Annual Meeting, Crerar Library, 8:00 P. M.

June 24 Mid-West Horticultural Society, Administration Building, Garfield Park, 8:00 P. M.

June 25 Prairie Club walk, Calumet Park (Industrial — swim — tennis), 5-6 miles.

June 26 Chicago Cactus Society, Garfield Park Conservatory, 3:00 P. M.

June 30 Prairie Club walk; Rose Walk, The Sag. 5-6 miles.

Birds Against Men

(Continued from page 30)

of kingbirds, the author brings a feeling of appreciation for nature with a fullness unusual in recent books. For those addicted to the delightful habit of "bedside books" I recommend this little volume—seven essays, one week —but I feel sure that the week will not be up when the volume is finished the first time!

The physical quality of all Viking Press books is not lacking— a well-bound volume with ample individuality —but the quality of Mr. Halle's essays should command the illustrations of an artist who also knows and feels nature, who can paint the birds as well with the brush as Mr. Halle has with the pen.—W. L. Necker.

TRAILSIDE MUSEUM

Maintained in Thatcher Woods by
The Forest Preserve District of Cook County
in cooperation with The Chicago Academy of Sciences

Out in Thatcher Woods the Trailside Museum is completing its sixth year of existence. This little informal and intimate institution occupying only four rooms, had the distinction of entertaining and enlightening over 50,000 visitors this past year. Every year increased attendance bears witness to its popularity. Although closed for redecoration from the latter part of October to early December, the present rush of visitors shows that its many friends and patrons are anxious to see it in it's "new glory." Children and adults alike flock through its doors.

The Trailside Museum was established in 1931, in an historic building which once housed the general headquarters offices of the Forest Preserve District at Thatcher and Chicago Avenues, River Forest. It was modeled after the Trailside Museum at Bear Mountain, New York. Its originator, Captain Charles G. Sauers, General Superintendent, has given its staff the very best of cooperation since its inception. For scientific advice and assistance Captain Sauers turned to the Chicago Academy of Sciences. Both advice and material aid were promptly given by A. M. Bailey, Director. This same helpful program has been continued by its new Director, Dr. H. K. Gloyd, who has been helpful in mapping out a program of reconstruction for the museum.

Our visitors are students of biology,

botany, zoology, herpetology, and kindred sciences, increasing their knowledge of subjects treated in textbooks by sight and touch; children, in whose young minds is the desire for learning; elders with a desire to acquaint themselves immediately with the phenomena of Nature, and others who are just curious. They come singly, in couples, groups, families and classes. They manifest intense interest and return often. Schools, organizations such as Boy Scouts, Girl Scouts, Campfire Girls, and hiking clubs, adult groups such as women's clubs and garden clubs and others use the museum with increasing regularity.

Nature walks conducted each week in the early morning and late afternoon are started in the spring and continue through the fall. Those attending are taken through the woods under the guidance of an instructor who lectures upon the flora and fauna met with during the trip. Any group of ten or more may schedule a walk by making arrangements with the museum in advance. In the spring and fall special nature study courses are conducted by Boy Scouts and Girl Scouts.

Our attempts to run a marked nature trail have been discontinued because of the difficulty of keeping markers and labels along the trail. The markers were so badly defaced or destroyed or removed by a disinterested few that it was impossible to keep them up. Often the marked specimens themselves were defaced or removed. The colored markers now used on the trails and the labels which differentiate the various species of trees are placed well up out of reach of thoughtless vandals.

Many new exhibits and specimens have been added during the past year. Living specimens are kept only for a short time and then set free. They are supplied to the museum by students and friends. Two hundred and seventeen species of flowering plants collected by the staff last summer have been added to the herbarium. Many new live specimens of birds, mammals and reptiles have been added. A great horned owl, a short-eared owl, sparrow hawks, crows, robins, starlings, blue jays, and mourning doves are among the live birds now on exhibition. Ferrets, skunks, squirrels, and an albino mink now make the museum their home. A new wall case of mounted mammals was added this spring. Our collection of tree leaves of the local region is now complete.

The museum is now resplendent with a new coat of paint inside and out. The cream-colored walls trimmed with buff make the interior much lighter and more pleasant. All cases not finished in natural wood are painted buff to match the walls. The old built-in cases have been removed and replaced with movable natural finish cases to facilitate cleaning and neatness of appearance. Several smaller movable reptile cases have replaced the large unwieldy built-in wall cases. A glass aquarium has replaced the old turtle tank. The interdependence exhibit has been reorganized. A new chart of local snakes painted in natural colors from live specimens has just been framed and hung in the reptile room.

During the winter months the exhibit of tree leaves has been remounted. During the spring and summer it is hoped that we will be able to complete our insect collection and replace some of our present specimens. These projects along with plans for enlarging our contacts with schools and various interested organizations should keep the staff busy.

The Trailside Museum lost a valuable assistant and aid last fall when Bertrand Wright, who served both faithfully and well, resigned to complete his collegiate work at the University of Illinois. Mr. Wright will receive his B.S. degree in June with a major in zoology. His place has been taken by Robert Allen, who has had two years experience at the Field Museum.

Gordon Pearsall, Curator.

NOTES FROM THE FIELD

A Unique Chimney Swift's Nest

While climbing along the rocky shore of Lake Superior this summer (1937), near the Canadian border, I came upon an abandoned shack formerly used by a commercial fisherman. It was in a dilapidated condition, due

to the action of water and ice. I had been maintaining a bird banding station in the neighborhood during the summer and on the June day in question was searching this rocky Lake Superior shore for nests holding juvenile birds which might be banded. I edged my way through a partially blocked door in the old building expecting to find some phoebe or barn swallow nests. There was a phoebe nest under an old stairway. Climbing to the second floor, I found a small room lined with celotex and was surprised to find two chimney swifts clinging to the wall. At first I supposed they were immature birds which had wandered from some adjacent chimney. I had no difficulty in capturing them and found they were mature birds. After banding them, I looked around the little room and was surprised to see the unique swift's nest, shown in the accompanying illustration, glued to the celotex siding, just below the cornice of the ceiling. Scattered along at the side of the nest and extending slightly downward, was a broken chain of single twigs, like a miniature stairway leading up to the nest. The celotex just above this chain of twigs was worn off to a lighter color, indicating that the twigs were used by the birds in roosting.

The chimney swift is distinguished for its many unusual habits—but here was a pair of eccentric birds which even exceeded their fellows in this respect and broke the rules of their clan in abandoning the usual chimney and building this unique nest on the exposed wall of the fisherman's shack. Very few instances have been reported where the swift has abandoned the chimney as a nesting site.

Samuel A. Harper.

Many of our friends drop us a note after their week-end outings, telling us some of the interesting things which they have met, and occasionally asking for identifications and suggestions for outings elsewhere. Won't you send us a note when you come across something of interest on your hikes?—Ed.

H. G. FIEDLER

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